

## **Conceptualizing Community Resilience to Global Environmental Change in the Context of Food Insecure Drylands**

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**Paper presented at Conference on the Human Dimensions of Global Environmental Change “Social Dimensions of Environmental Change and Governance”, Berlin, 8-9 Oct 2010**

### **Abstract**

While increased emphasis is placed on interactions between natural and human systems, understanding of social components of global environmental change (GEC) remains weak. Concepts of resilience, vulnerability and adaptive capacity become crucial in addressing these dimensions and need to be integrated to enhance our knowledge of consequences and responses to GEC in the context of development. In the past, approaches to GEC often solely focused on managing vulnerability while poor people were categorized as victims of environmental variability, economic exploitation and political marginalization. However, people have capabilities to cope with change and look for risk reduction strategies. A rigid vulnerability focus does not consider these capabilities and ignores levels of resilience and adaptive capacity of communities. A more positive approach is to recognize people as active agents with varying abilities to respond to change, rather than passive victims; thus highlighting resilience as it varies across communities.

Resilience is increasingly central to development debates and is a crucial element in determining societies' response capacities to change. Theoretical frameworks are applied in various contexts, while using a diverse range of definitions. This paper aims to provide an overview of the intellectual foundations of resilience and development; to contextualize resilience as a societal response option to GEC in development; and, focusing on drylands, to discuss its relevance, considering controversies over its definition, strengths and weaknesses.

The discussion shows that resilience in development remains a largely elusive concept with weak practical application. There is a need for improved integration of resilience within a multidimensional paradigm that addresses local needs and future change. This is crucial in drylands, where the role of risk needs to be better understood to realize the full potential for development through strengthening human adaptive capacity. A resilience approach to development is suggested to enhance the appreciation for the interactions of societal responses to GEC within the context of development. It offers an adaptive and interdisciplinary view, while strengthening community participation and empowerment towards sustainable pathways out of poverty.

## Introduction

Global environmental change (GEC) is presenting communities around the globe with unprecedented challenges and is a priority on the international agenda. While GEC includes change in the biophysical environment that is brought about by anthropogenic or natural causes, it is manifest at different scales and can be distinguished in systemic and cumulative changes (Kasperson *et al.*, 2001). Systemic GEC takes place through changes in global systems, although the activities that cause those changes are not necessarily global in scale, such as anthropogenic disturbances of atmospheric, marine and biological systems potentially altering earth system processes and functions (Turner II *et al.*, 1990; Kasperson *et al.*, 2001). Cumulative GEC is global due to its effects on a major proportion of a global resource, or due to the accumulating character of local or regional changes (Turner II *et al.*, 1990). While cumulative GEC takes place at discrete locations, these changes are widely distributed to be global occurrences and include processes that bring about changes in the availability, quality and diversity of resources<sup>1</sup> (Turner II *et al.*, 1990; Kasperson *et al.*, 2001).

Currently, systemic GEC (particularly climate change) is receiving great attention. However, a variety of impacts on communities across the globe today are due to cumulative GEC; with potentially more harmful societal consequences (Kasperson *et al.*, 2001). Communities' perceptions, vulnerabilities and responses to GEC play out through environmental conditions at local levels; in this context cumulative changes become increasingly relevant (Turner II *et al.*, 1990). Consequently, understanding cumulative GEC is essential for improved knowledge of the human dimensions of GEC. Pressures, such as increasing population and urbanization, economic growth, agricultural intensification and land use change, land tenure systems, as well as technological change, levels of consumption, the global political economy and changing societal values are major 'driving forces' of GEC<sup>2</sup> (Turner II *et al.*, 1990; Kasperson *et al.*, 2001). Moreover, the links between GEC, globalization and inequality have the potential of creating more intense global risks to human well-being, such as geo-political insecurity, social instability, food insecurity and deprivation (Adger *et al.*, 2005b; Nissanke and Thorbecke, 2006; Amoroso, 2007).

Although GEC is as old as history, challenges have reached a new dimension due to scale and intensity of human activity and thus needs to be addressed at both local and global levels (Kasperson *et al.*, 2001; Holling *et al.*, 2002). The need for an improved understanding of the impacts of GEC on communities has been recognized. While emphasis is placed on the interactions between natural and human systems, knowledge of the social components of GEC remains weak (Vogel, 2006). This is particularly true for drylands, covering 41% of the Earth's land surface and being home to more than 35% of the global population (Mortimore, 2009). At least 90% of dryland populations live in developing countries, characterized by high poverty levels (MEA, 2005). With limited progress towards achieving the Millennium

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<sup>1</sup> Systemic GEC includes climate change, greenhouse gas emissions, land cover changes in albedo and sea level changes, while examples of cumulative GEC are contamination and depletion of air, water and land resources, degradation of ecosystems, biodiversity depletion, deforestation, soil depletion, desertification, and urbanization.

<sup>2</sup> Turner II *et al.* (1990) distinguish anthropogenic activities that cause GEC as 'proximate sources' and 'driving forces', while the former refers to human activities that directly affect the environment (e.g. burning of biomass), the latter includes a more complex set of pressures that lead to 'proximate sources' (Turner II *et al.*, 1990).

Development Goals (MDGs) in these countries, exacerbated by high population growth<sup>3</sup>, and high vulnerability to GEC (Boko *et al.*, 2007), drylands should be central in global development strategies. This requires an integrated perspective in drylands, where a new paradigm is needed to better meet local needs and realize the potential for development in the light of change (Vogel, 2006; Mortimore, 2009).

Approaches to GEC often focus on the prospect of managing vulnerability (Smit and Pilifosova, 2002; Wisner, 2004). Poor people are frequently characterized as victims of environmental variability, economic exploitation and political marginalization (van der Geest and Dietz, 2004; Mortimore, 2009). Yet people have capabilities to deal with change and continuously look for strategies to reduce risk and exploit opportunity (Barnett, 2001; Wisner *et al.*, 2004). Thus, a focus on reducing vulnerability may distract from enhancing resilience and adaptive capacity. It is increasingly recognized that dryland communities have successfully responded to uncertainty in their environment and developed resilience in light of inherent adverse conditions (Mortimore, 2009). An improved knowledge of resilience will contribute to an enhanced understanding of the challenges of human-environment interactions under GEC within the context of sustainable development (Adger, 2006).

The concepts of resilience, vulnerability and adaptive capacity become relevant in addressing the social dimensions of GEC. Yet, they emerged from different intellectual traditions and the challenge is to integrate these concepts to enhance our knowledge of the consequences and response options of communities to GEC (Janssen and Ostrom, 2006). The concept of resilience is a central element of how a society adapts to change. The use of the concept of resilience has proliferated in the academic literature and in various development contexts, though different definitions and perceptions of the concept are in use (Cannon, 2008). An improved understanding of resilience to GEC may contribute to forging a better linkage of understanding among different disciplines. This paper aims to make a contribution to this debate by assessing the relevance of the concept of resilience for developing sustainable pathways out of poverty focusing on drylands. The following chapters outline current debates on GEC, provide an overview of the intellectual foundations of resilience, and of the evolution of development thinking. The paper further contextualizes the importance of resilience as a societal response option to GEC in a development context. The relevance of resilience is discussed, considering the concerns over its definition and application, and its potential in addressing food insecurity in the context of GEC.

### **Current Debates on Global Environmental Change**

The understanding of GEC and its causes has altered over time (Herrmann and Hutchinson, 2005; Hutchinson *et al.*, 2005). Adger *et al.* (2005b) “believe that global environmental change is best understood as processes that are manifest in localities, but with causes and consequences at multiple spatial, temporal and socio-political scales” (p2). Human activities have diverse impacts on the environment and the relevance of anthropogenic drivers of GEC is no longer questioned (IPCC, 2007). Since GEC is an accepted threat for human well-being, emphasis has to be placed on determining societal responses that may foster

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<sup>3</sup> In the 1990s, dryland populations grew at an average of 18.5%; faster than in any other ecosystem (MEA, 2005). Population growth over the next decades is expected to be highest in African drylands (Pinstrup-Andersen *et al.*, 1999).

sustainable development (Urich and Quirog, 2009). Human activities, combined with the degree of susceptibility of the biosphere, and the vulnerability of the socio-economic system determine the risks that GEC poses to society (Kasperson *et al.*, 2001). Initially, discussions were dominated by physical sciences, to gain knowledge on the complex processes underlying GEC (Leichenko and O'Brien, 2008), though this is only one component of the human interactions with GEC. Societal impacts and response options were to follow once the 'science' of changes was better understood. Mitigation and the effectiveness and acceptability of options entered the debate more recently; followed by adaptation (Stehr and von Storch, 2005; IPCC, 2007; Liverman, 2008; Dovers, 2009). The societal dimensions of GEC are complex, as human activities are not only sources of changes, but societies are also objects of change (Redclift, 1992). Whether GEC constitutes a societal risk, how serious the risk is perceived and what type of response is devised, is critical. This depends on how signs of GEC are perceived by society, while factors such as social meaning, cultural values, societal contexts, political agendas, and individual perceptions play a role (Kasperson *et al.*, 2001; Urich and Quirog, 2009). Societal response options to GEC include a range of possible pathways, from risk avoidance to mitigation and adaptation (Kasperson *et al.*, 2001).

A growing debate has emerged around the interactions between mitigation and adaptation as either complementary or potentially conflicting responses<sup>4</sup> (Klein *et al.*, 2007; Rogner *et al.*, 2007). The apparent separation of mitigation and adaptation (e.g. in the IPCC) is viewed critically, as it may result in separate policies with potentially increased costs of response (Tompkins and Adger, 2005). Both mitigation and adaptation are essential and complementary: on the one hand, mitigation is required to minimize irreversible changes in the long run or changes that would make adaptation very costly; on the other hand, adaptation to GEC is already happening and is essential due to the time lag in potential mitigation effects (Rogner *et al.*, 2007). In this context, an 'optimal mix' of adaptation and mitigation calls for trade-offs of welfare impacts at different spatial and temporal scales (Klein *et al.*, 2007). Vulnerability and resilience are important concepts in this debate in determining mitigative or adaptive capacities and how policy should be shaped to pursue an optimal solution.

### **Definitions of Resilience and Its Intellectual Foundations**

The ability of society to sustain desirable features of our environment is increasingly compromised by unprecedented GEC. This requires an enhanced understanding of how people respond to risk and change (Resilience-Alliance, 2005). In this context, resilience, vulnerability and adaptive capacity become crucial in explaining human consequences of GEC (Vogel, 2006). However, definitions have emerged from different intellectual traditions and thus have diverse meaning (Janssen *et al.*, 2006; Mohaupt, 2009). A bibliometric analysis of the knowledge domains of resilience, vulnerability and adaptive capacity illustrates an increase in publications over the last decades, while integration has been slow (Janssen *et al.*, 2006). Multi-dimensional concepts offer opportunities to integrate knowledge to better comprehend the complex interactions of natural and human systems and to respond to GEC more effectively (Janssen and Ostrom, 2006; Vogel, 2006).

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<sup>4</sup> In climate change, mitigation addresses those actions that are intended to reduce the magnitude of change *per se* (e.g. reducing greenhouse gas emissions), while adaptation aims to moderate harm or exploit opportunities that will accompany change (i.e. adjustments of the human system in response to change) (Klein *et al.*, 2005).

Resilience is central to understanding the dynamics of social-ecological systems (SES) and their vulnerability to shocks, and is a crucial element of how societies cope with uncertainty and adapt to change (Berkes *et al.*, 2003a; Adger, 2006). The concepts of resilience and vulnerability have been used in diverse ways by various disciplines, e.g. ecological theory, systems analysis, disaster studies (Berkes *et al.*, 1998; Tobin, 1999; Gallopin, 2006; Janssen and Ostrom, 2006). While resilience has its roots in the study of ecosystems, vulnerability is used by social scientists in hazards and poverty research (Janssen and Ostrom, 2006). Authors recognize that a focus on vulnerability distracts from resilience and adaptive capacity (Start and Johnson, 2004; Wisner, 2004). The study of vulnerability tends to focus on predicting problems, while ignoring that people are not passive victims of disasters, but active agents of their own lives and resourceful in their strategies to reduce vulnerability (Davies, 1996; Thomas and Twyman, 2005). Incorporating the concept of resilience recognizes people as active agents in decision-making rather than passive victims of change. It recognizes the ability to cope with and adapt to change, and the capacity to self-organize and learn, i.e. the capacity to seize opportunity for innovation and development.

### Resilience in Social-Ecological Systems Theory

Early definitions of resilience assumed stable environments where resources could be controlled and nature repaired itself after disturbance (Folke, 2006). Holling (1973) initiated a paradigm shift about ecosystem stability by using resilience to explain non-linear dynamics and threshold effects. He defined resilience as “a measure of the persistence of systems and of their ability to absorb change and disturbance and still maintain the same relationships between populations or state variables” (p14) (Holling, 1973); emphasizing complexity, the potential for multiple equilibria, and heterogeneity of temporal and spatial scales (Folke, 2006; Gallopin, 2006). More recently, resilience is used in SES, representing the two realms as interlinked and complex (Berkes *et al.*, 2003a). In a SES, resilience is characterized by (a) the amount of disturbance that a system can absorb while remaining in a given state, (b) the degree to which it is capable of self-organization, and (c) its capacity for learning and adaptation (Carpenter *et al.*, 2001; Berkes *et al.*, 2003a). Resilient SES constantly self-organize, evolve and adapt to surprise to maintain function. The phases of development in SES are described as adaptive cycles with periods of exploitation, conservation, release and reorganization (Gunderson and Holling, 2002; Berkes *et al.*, 2003b).

While there is a long history of investigating ecological resilience, the concept is relatively new to the social sciences; though there is increasing interest in its social dimensions (Folke, 2006). Adger (2000) illustrates that simply transferring the concept of resilience from ecological to social systems is contested, as it assumes that there are no differences in structure and behavior of the two. In social systems, resilience is linked to adaptive capacity, which reflects the ability to learn in response to disturbances through institutions with flexible, novel and creative approaches to problem solving (Carpenter *et al.*, 2001; Marshall, 2010). Resilience includes not only the capacity to cope with change, but also to take advantage of opportunity for innovation and development (Folke, 2006; Gallopin, 2006). Adaptive capacity as a component of resilient systems describes preconditions that need to be met for adapting to change; i.e. ability of social actors in the system to influence resilience (Berkes, 2007). Human capacity for deliberate action and foresight, reflexivity and technological development distinguishes social from ecological systems and makes adaptive capacity relevant (Walker *et al.*, 2006; Young *et al.*, 2006; Folke, 2009). Especially in natural resource-dependent communities, resilience relates to other characteristics of human-environment relationships, such as vulnerability to food insecurity and other hazards.

## Resilience in Vulnerability Theory

Resilience is an important component of the analysis of vulnerability, e.g. in climate impact analysis, disaster management, poverty research and food security analysis (Dilley and Boudreau, 2001; Vasquez-Leon *et al.*, 2003; Wisner *et al.*, 2004). While vulnerability generally refers to the notion of potential for harm, resilience is often considered its response component. Vulnerability can be seen as a way to frame what may happen to a population when exposed to a particular stress, e.g. as a result of the impacts of GEC. Vulnerability does not exist in isolation but is defined in relation to a specific hazard (Kelly and Adger, 2000; Wisner *et al.*, 2004). It combines exposure of regions, communities, households or individuals to shocks with internal capacities (or lack thereof) to cope, and risk of severe consequences or limited recovery (Chambers, 1989; Bohle *et al.*, 1994; Adger, 2000; Cannon *et al.*, 2003). Risk of exposure is universal as people are subject to the same shocks; but vulnerability, via resilience, differentiates among socio-economic groups (Downing, 1991). Resilience is used as reciprocal to vulnerability; although it more closely relates to the response capacity and is less than its reverse (Gallopín, 2006). The ability to anticipate, cope with, and recover from impacts of crises is determined by a community's resilience.

These perspectives are shaped by disaster research, though vulnerability has also emerged out of famine research in drylands. Within this context, the changing understanding of the causes of food insecurity over time has significantly influenced the knowledge of vulnerability (Hutchinson, 2001). Up to the late 1970s, famines were explained by focusing on the causes and consequences of food production failures (Davies, 1996; Devereux, 2006) and thus resolution was pursued through attempts to bolster global food supplies. Famines were largely perceived as external events, while natural hazards (e.g. drought) were conceptualized as main causes of vulnerability (Adger *et al.*, 2005b). This de-contextualized famines from the structural social, economic and political processes that generate them (Howe, 2010). Recurring food crises in the Sahel during the 1980s demonstrated the limitations of the supply side focus. It became clear that national food security does not translate into household food security and thus, that food security is not only determined by supply, but also by effective demand. Sen (1981) argued that food insecurity is not the product of production shortfalls but the lack of access to food. His concept of entitlements was crucial in the development of a vulnerability theory that explains food insecurity as it relates to political, institutional and socio-economic factors (Watts and Bohle, 1993; Webb and von Braun, 1994; Wisner *et al.*, 2004).

The integration of empowerment and political economy approaches were further advancements in building a theory of vulnerability, later adding human ecology (Watts and Bohle, 1993; Bohle *et al.*, 1994; O'Brien and Leichenko, 2000; Wisner, 2003). Natural hazards are no longer perceived as the main cause of vulnerability to food insecurity. They are typically external triggers, whereas vulnerability that leads to an emergency is spawned by underlying political, institutional, economic, demographic and socio-cultural factors that establish how people are differentially affected by drought (Wisner *et al.*, 2004). Famines are increasingly understood as complex, non-linear and dynamic systems that arise from a combination of conditions rooted in longer-term structural processes (Howe, 2010). Devereux (2006) argues that the entitlement approach as an economic explanation of famine is less able to explain famines caused by policy failures, civil conflict or failures of the international relief system. Today famines are predominantly response failures closely linked to governance failures, as famines are almost always (technically) avoidable, and thus either deliberately caused or not prevented (Devereux, 2006). This shift in thinking emphasizes that political responsibility can be assigned to either efforts that create famine conditions or the absence of efforts to avert them (Devereux, 2006). New thinking about famine places more attention on

complex emergencies (Duffield, 1994; Macrae and Zwi, 1994), social contracts (de Waal, 2000), new variant famines (de Waal and Whiteside, 2003), impacts of HIV/AIDS (Edkins, 2002) and accountability (Devereux, 2006).

Enhanced understanding of the complexity of disasters and of the impacts of global environmental, economic or political processes on societies has heightened the interest in vulnerability (Wisner *et al.*, 2004). Vulnerability and poverty are closely related. Poverty is a measure of current welfare and vulnerability has value of what might happen in the future (Prowse, 2003; Bird and Shinyekwa, 2005; Kumar *et al.*, 2007). Though poor people are often the most vulnerable, not all vulnerable are necessarily poor (Prowse, 2003; Deng, 2008). Vulnerability, and security as its reciprocal, are fundamental concerns of poor people, while stresses often result from structural economic, political and social contexts (Chambers, 1989). As the understanding of vulnerability is contributing to an enhanced knowledge of resilience, the challenge is to integrate resilience more effectively in development (Adger, 2006; Janssen and Ostrom, 2006). The following section provides an overview over the evolutions in development thinking to contextualize the debate on resilience.

## **Evolutions in Development Thinking**

### Major Paradigm Shifts in Development

The development sector and its institutions have been largely put into place after World War II. Development strategies after the end of colonialism focused on macro-economic interventions, as it was widely believed that national economic growth would 'trickle down' and lift everyone out of poverty (Thorbecke, 2000). The 'third world' was considered homogenous with little differentiation in the nature of poverty, which was considered a technical problem that could be resolved by adding 'western' capital, technology and know-how (Nolan, 2002). Development approaches were based on 'western' scientific concepts and blueprint solutions, linked to theories of modernization and dependency (Schulz, 1999; Leach *et al.*, 2008). Approaches focused on top-down, expert-driven development.

Development assistance during the 1970s and 1980s was mostly targeted on the basis of geopolitical and economic interests, such as the cold war. Recipient governments were largely unaccountable and many donors turned a blind eye to the undemocratic nature of many aid recipient governments (Sharp, 1995). The 1980s were shaped by economic liberalization driven by the demands of the Washington Consensus, implemented through structural adjustment policies that required recipient governments to cut public spending, open their economies and privatize unprofitable enterprises (Nayyar, 2008). Growth-oriented development was seen as strategy out of the debt crisis, and ultimately out of poverty.

The breakdown of the global political system with the end of the cold war, the realization that macro-economic policies rarely achieved benefits for poor countries and the increasing indebtedness of recipient countries seriously questioned aid effectiveness and were driving shifts in development thinking towards governance-based strategies and towards meeting the basic needs of the poor (Sharp, 1995). The failure of structural adjustment policies was attributed to the lack of good governance and led to complementing economic growth policies with institutional restructuring. Receiving assistance became increasingly conditional upon reforms towards accountability, transparency and democracy. The abrupt end of the cold war, coupled with widespread concerns about the ineffectiveness of aid, the fear of aid dependency, and awareness of corruption led to a decrease in aid flows (Thorbecke, 2000). The critique of prevailing theories created a new sensitivity for gender, local participation, environment and grassroots development (Thorbecke, 2000; Nolan, 2002).

After decades of restructuring, by the 1990s, people in many recipient countries were no better off than before receiving aid. Continuous political misrule, economic decline and impoverishment called for reassessment of development strategies. Poverty reduction becomes a priority, as poverty is increasingly understood as a complex and location-specific problem, rooted in socio-cultural structures and in the distribution of economic and political power (Robinson and Tarp, 2000). Development becomes concerned with public sector accountability and participation. The dismantling of the public sector in the name of economic necessity left a vacuum in providing services that gave rise to increased responsibilities for the local level, NGOs, and the private sector (Sharp, 1995). NGOs emerged as increasingly important political actors and were seen as an alternative to the state for local service delivery, with the potential of overseeing the move towards democratization (Lewis, 2002). The governance agenda suggested that a virtuous relationship could be built around the main actors: state, economy and civil society – to balance growth, equity and stability (Lewis, 2002). This highlights inadequacies of existing mechanisms, drawing attention to the importance of efficient institutions to support governance. Overall, the lack of good governance has been made responsible for shortcomings in poverty alleviation and good governance accepted as precondition for development (Sharp, 1995). However, it has become a buzzword used with a variety of meanings and thus lost some of its power (Kura, 2008).

Development was reframed with the Brundtland Report (1987) as having to be sustainable, with emphasis on local development, environmental concerns, social-cultural dimensions, and equality (Schulz, 1999). Understanding how poor people make a living in unfavorable environmental, economic and political conditions is important to develop better opportunities of intervention. Participatory approaches gained popularity in mainstream development, emphasizing that local people should do much of their own analysis, planning, and implementation, with outsiders acting as facilitators (Chambers, 1994). The livelihoods approach gained importance as the focus was broadened to encompass not only food but livelihood security, based on the understanding that people have a range of priorities and food is only one of them (Sharp, 1995; Davies, 1996; de Haan and Zoomers, 2005). Initial definitions of sustainable livelihoods were proposed by Chambers and Conway (1991) and modified by Ellis (2000) to: "*A livelihood comprises the assets (natural, physical, human, financial and social capital), the activities, and the access to these (mediated by institutions and social relations) that together determine the living gained by the individual or household.*" (p10). It is based on the concepts of capability, equity and sustainability: capability refers to the ability of perform basic functions, cope with stress and make use of opportunities; equity is the more equal distribution of assets, capabilities and opportunities; and sustainability is the ability to improve livelihoods while maintaining the assets on which they depend (Chambers and Conway, 1991). The definition considers links between assets and options people have to pursue alternative livelihood strategies. It emphasizes access, i.e. the rules and social norms that determine the differential ability of people to control resources (Ellis, 2000). Important additions to the concept include: livelihood diversification and adaptability as ways in which people try to improve their livelihoods (Davies, 1996; Ellis, 2000); the role of social capital in facilitating access to resources, and meanings of livelihoods beyond economic dimensions (Bebbington, 1999). The approach encourages a comprehensive understanding of the interactions between people, environments, policies, institutions, society and development (Bebbington, 1999; Neefjes, 2000).

This overview demonstrates the shift in development approaches from macro-economic and top-down to micro-level and participatory. It illustrates the changing views of poverty as being complex and multi-dimensional. The recognition that development approaches often failed to meet the targets while focusing on the national level, on infrastructure rather than people, all of which has led to an increased adoption of livelihoods



approaches. These have added to understanding the dynamic dimensions of poverty in an integrated manner and may similarly contribute towards reducing vulnerability for poor communities to GEC. Drylands deserve additional attention, as these regions are often neglected in mainstream development because of their modest and highly variable natural resource base and, as a consequence, are considered particularly vulnerable to GEC.

### Changing Narratives of Drylands Development

Drylands cover over forty percent of the Earth's land area, supporting over two billion people (MEA, 2005). These areas have not received adequate attention in development or investment – despite over sixty percent of poor communities in developing countries living in drylands and being amongst the most vulnerable, impoverished or marginalized communities (UNEP, 2007; Mortimore, 2009). Drylands include some of the most marginal lands where water scarcity is the main limiting factor for agricultural production and other ecosystem services (Ruben and Pender, 2004; MEA, 2005; Assan and Kumar, 2009). They are characterized by low levels of human development, poor infrastructure and access to markets and services, limited investment, limited agricultural potential and high land degradation, as well as high rates of population growth and already high population densities, especially in highland areas (Kuyvenhoven *et al.*, 2004; Ruben and Pender, 2004; van Haren *et al.*, 2010). However, a strong lobby is lacking for drylands development within the GEC debate.

Dryland communities tend to rely on sectors highly sensitive to GEC, e.g. rainfed agriculture and pastoralism (Adeel *et al.*, 2008; Assan and Kumar, 2009). GEC is already affecting drylands in Sub-Saharan Africa (SSA), where increased droughts due to climate change are intensifying the conditions of poverty (Adeel *et al.*, 2008). Current knowledge about GEC impacts in drylands does not allow accurate predictions; but as the consequences of GEC – increased climate variability, environmental degradation, cultural change – are predicted to intensify, dryland communities are expected to be least resilient to GEC (Marshall, 2010; Mearns and Norton, 2010). Vulnerability to GEC is important to address in drylands dependent on scarce resources, as poor people have limited capacity to cope with every day stresses and GEC adds to existing vulnerabilities. Africa is one of the most vulnerable regions to GEC due to multiple stresses coupled with high population growth, increasing pressure on resources, and low adaptive capacity<sup>5</sup> (IPCC, 2007). Consequently, SSA dryland populations may be severely affected by food insecurity in the future and should play a central role in global poverty reduction strategies (van Haren *et al.*, 2010).

Responses to GEC have to take existing narratives into account. Perceptions, and misperceptions, of drylands are built largely on degradation narratives (Mortimore, 2009). The coexistence of high levels of poverty and food insecurity with high rates of land degradation has led to the understanding that these factors are linked (Brundtland, 1987). The narrative of population growth as main driver of land degradation goes back to Malthus (Malthus, 1798). Since the 1930s there have been claims that small-scale farmers are degrading their land, with predictions well into the 1990s that Africa is heading towards environmental disaster (Mazzucato and Niemeijer, 2001). This relationship is described as a 'downward spiral' of poverty, population and degradation, where people, pushed by

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<sup>5</sup> with a projected increase in water stress affecting 250 million people in 2020, and reduced crop yields from rainfed agriculture of up to fifty percent (IPCC, 2007)

population growth and poverty place increased pressure on land, leading to degradation; which affects land productivity, leading to reduced soil fertility, declining crop yields, consequently contributing to food insecurity (Reardon and Vosti, 1995; Scherr, 2000; Pender *et al.*, 2001; Koning and Smaling, 2005). Neo-Malthusian narratives explain demographic pressures as one contributing factor to degradation and vulnerability to food insecurity (Devereux, 2006; Hartmann, 2010), while poor households often have limited capacity to make long-term natural resource investments (Assan and Kumar, 2009), have limited access to information and operate in inappropriate policy and institutional environments (Shiferaw *et al.*, 2009). In recent decades, there has been increased questioning of these interpretations and a rich body of case studies on small-scale agriculture and pastoralism in SSA challenges these narratives of population, poverty and degradation (Tiffen *et al.*, 1994; Davies, 1996; Leach and Mearns, 1996). Böserup (1965) argued for a positive effect of population growth on agricultural innovation and productivity. Resource scarcity in fact may inspire farmer innovation and investment in conservation (Scherr, 2000). Increasing evidence suggests that the relationship between poverty and degradation is highly dependent on local conditions, power relationships and enabling policy environments (Leach and Mearns, 1996; Mortimore, 1998; Batterbury and Forsyth, 1999; Mazzucato and Niemeijer, 2001; Warren, 2002; Gray and Moseley, 2005). Despite powerful criticisms, the degradation narrative continues to persist in the development arena as crises justify interventions: assuming increased migration as a result of environmental scarcity justifies interventions in the name of global security (Hartmann, 2010). While misperceptions of drylands continue to dominate policy debates, both narratives contribute important explanations, as poor people are both agents and victims of GEC (Assan and Kumar, 2009). However, degradation and resource scarcity are often not a result of population pressure and poverty, but can be attributed to conflict, structural political, historical and institutional factors (e.g. in Darfur) (Hartmann, 2010).

Generally, a fairly gloomy picture is painted for dryland communities with respect to their vulnerability to GEC and potential impacts on food insecurity and degradation (Burton, 2001). However, drylands offer encouraging examples of overcoming the downward spiral of poverty, population and degradation (Mortimore, 1998; Vogel and Smith, 2002; Ruben and Pender, 2004). This raises questions about the effectiveness of current strategies and points towards the need for new paradigms to inform drylands development (Reynolds, 2007; Mortimore, 2009), taking multiple livelihoods perspectives and vulnerability contexts into consideration while not adhering to one narrative. A failure to address development and vulnerability to GEC in drylands will have broader consequences, not only because of the physical extent and the size of its population, but also because of the interactions of drylands with global environmental, economic and geopolitical systems (Mortimore, 2009). An improved knowledge of the responses of communities to uncertainty and their successes in managing existing pressures becomes increasingly relevant. Resilience thinking has the potential to contribute towards these changing paradigms, as it offers new perspectives on systems thinking, linking social and ecological components, emphasizing human agency, and recognizing complexity and multi-scale interactions.

## **Resilience Thinking in Drylands Development**

### Relevance of the Concept of Resilience in Development

Over the past decades, there has been increasing concern about the impacts of GEC (especially climate change) on the potential for poverty reduction (Grist, 2008). Vulnerability to GEC may exacerbate existing development challenges by pushing poor people closer to the edge. GEC thus constitutes a significant threat to human development, undermining development gains that have been made to date and dimming hopes for continuation into the future (Kasperson *et al.*, 2001; Boyd *et al.*, 2009). With an improved understanding of the

complexity of underlying factors that determine vulnerability to different hazards, there has been a heightened interest in the concept of resilience. It has become a buzzword in the GEC debate and is increasingly used in the development arena, e.g. recent reports revolve around poverty reduction, resilience and climate change (UNDP, 2007; WRI *et al.*, 2008; UNFPA, 2009; World-Bank, 2009). WRI *et al.* (2008) emphasize the links between poverty, environment and governance, and consider strengthening resilience a step towards reducing poverty. UNDP (2007) sees the fights against poverty and climate change as reinforcing processes that need to be addressed jointly. An issue of *Climate Policy* explores the options for an integrated approach to climate change adaptation and mitigation in the context of development (Bizikova *et al.*, 2007). The linkages between GEC responses, resilience and development are accepted at the international policy level. However, it is still largely a theoretical concept that is used rather loosely, lacking clear definitions, while practical application and integration of resilience and development remains weak (Boyd *et al.*, 2009; Stringer *et al.*, 2009; World-Bank, 2009; Mercer, 2010).

Framing the debate on GEC as a development, rather than environmental problem, will help focus on vulnerability of poor communities to GEC, while recognizing that the 'driving forces' are related to development pathways (Kasperson *et al.*, 2001; Klein *et al.*, 2007). Vulnerability and resilience are functions of the processes of daily life that are shaped by a locally unique configuration of socio-cultural, economic, institutional, environmental and political conditions (Watts and Bohle, 1993; Handmer *et al.*, 1999). These components are critical in determining livelihood strategies and outcomes. The structural causes of livelihood insecurity and GEC are often similar, and response options are closely interconnected (Bizikova *et al.*, 2007; Stringer *et al.*, 2009).

For dryland communities that are chronically food insecure, vulnerability to complex disasters is part of the daily struggle to survive (Cannon *et al.*, 2003). The persistence of structural vulnerability to food insecurity is largely a result of the combination of livelihood insecurity, poverty and vulnerability to hazards (Davies, 1996; Devereux, 2006). Differential vulnerability to GEC means that people are affected differently, making it important to address their resilience and adaptive capacity. The concept of resilience can contribute to both, more sustainable development pathways and GEC responses. In drylands, increasing resilience remains a challenge, despite growing recognition of existing adaptive capacities of communities and inherent resilience of SES in the light of adversity (Mortimore, 2009). Stringer *et al.* (2009) analyze the linkages between climate change, drought and desertification in SSA and conclude that these are most acutely experienced by populations dependent on natural resources for their livelihoods. They call for an enabling policy environment that helps to build the resilience of SES and strengthens local adaptations (Stringer *et al.*, 2009). This situation merits a broader perspective that considers resilience to GEC as integral component of long-term livelihood security.

The emphasis on building resilience to unprecedented GEC in rural livelihoods illustrates the interdependence between environmental risk, SES dynamics, social resilience, institutional context and the broader political economy of development (Adger, 2006; Dodman *et al.*, 2009). It can be applied to understand the challenges and opportunities associated with GEC and help build capacity to support overall development objectives. Important attributes of resilient systems are also critical for development: community capacity to withstand shocks, adapt to change and capitalize on opportunities for development (Folke, 2006; Leichenko and O'Brien, 2008). Social, political and economic trends reinforce, transform or weaken existing patterns of resilience. How resilience thinking can be better integrated into development and whether this is desirable has not been adequately addressed

(Jerneck and Olsson, 2008; Gaillard, 2010). The following section reviews this integration, while considering conceptual concerns in relation to the resilience-development nexus.

### Conceptual Concerns

A number of conceptual concerns need to be addressed to inform the discussion on integrating resilience and development – i.e. the importance of transformation, human agency and capacity, systems dynamics and adaptive management, and different intellectual foundations.

#### *Importance of Transformation*

Resilience can be a desirable or undesirable attribute of SES. In ecology, it is concerned with the ability of a system to cope with multiple disturbances and ‘bounce back’ to return to a desired reference state, instead of shifting to an undesirable one (Berkes *et al.*, 2003a). In this view, system transformations are not considered because they might create new states with different attributes that may be less wanted.

The notion of resilience as ‘bouncing back’ is less useful in social, or SES, because a return to desirable reference states may not be possible (Gunderson and Holling, 2002; Berkes, 2007). Undesirable system configurations – in economic, political or environmental conditions – may be very resistant despite attempts to change to a more desirable state (Cinner *et al.*, 2009; Francis, 2010). Such rigid systems are characterized by the lack of flexibility, suppression of innovation or holding on to current beliefs with the result of potentially violent regime shifts (Folke, 2009). Poverty, food insecurity and vulnerability to unpredictable GEC make many livelihood systems in poor drylands untenable and lock rural people into these systems. Here, returning to or maintaining a *status quo* (of poverty, vulnerability or inequality) is undesirable. Transformability to new, more desirable systems is crucial (Walker *et al.*, 2004; Folke, 2006; Jerneck and Olsson, 2008). Dodman *et al.* (2009) refer to “bouncing forward to a state where shocks and stresses can be dealt with more efficiently and successfully and with less damage to individual lives and livelihoods” (p168). For poor farmers trapped in livelihood systems they seek to escape, the transformation of existing institutions or ecological habitats is a critical feature of resilience (Boyd *et al.*, 2008). Resilience of resource-dependent livelihood systems relies not only on the function and diversity of the ecosystem, but on the governance and institutions of the social system (Tompkins and Adger, 2004).

Transformation as an attribute of resilience makes the discussion inherently value-laden (Boyd *et al.*, 2008). Managing resilience is about who has the right and power to decide about resilience of whom/what to what, whether it should be strengthened or eroded (Adger *et al.*, 2009a; Nelson and Stathers, 2009). This view challenges the structural factors of vulnerability and facilitates transformative capacity towards more sustainable development (Folke, 2006). Where resilience challenges the *status quo* of prevailing power structures and inequalities it becomes a contentious issue that has the potential to contribute to rethinking current development priorities (Francis, 2010; Hartmann, 2010). Thus, it is more appropriate to consider resilience in development as a process rather than an outcome: the goal is then to strengthen the ability to cope with and adapt to additional stresses and to transform in the light of uncertainty and unpredictability, while at the same time addressing structural vulnerabilities that constrain more desirable livelihood pathways (Walker *et al.*, 2004; Dodman *et al.*, 2009). Hence, resilience should strengthen transformative capacity towards general improvements in well-being, while at the same time creating capacity to reduce vulnerability to GEC and other stresses (Walker *et al.*, 2010). A concept to help respond to different priorities arising from change and to harness opportunities, resilience thus adds a new dimension in development.

## *Human Agency and Capacity*

Development thinking has been strongly influenced by vulnerability theories. Vulnerability tends to focus on negative outcomes of change, while ignoring that people are not passive victims of disasters, but active agents of their own lives and resourceful in their strategies to reduce vulnerability (Davies, 1996; Thomas and Twyman, 2005). The paradigm shift from deficits to resilience emphasizes human capacities for planned action as integral to any response to change (Mohaupt, 2009; Magis, 2010). It acknowledges that communities should intentionally develop their own resilience, while external agencies enhance existing capacities (Grist, 2008). Berkes and Seixas (2005) emphasize the capacity building element of resilience, which aims to actively support capacity to live with change and exploit emerging opportunities. Magis (2010) makes an important distinction between community capacity and community resilience. While community capacity relates to a community's ability to address a variety of development issues through collective action and mobilizing other community assets, community resilience specifically focuses on community capacity with regards to its ability to cope with changes that are new and largely unknowable. Community resilience "recognizes, accepts, builds capacity for, and engages change" and exists only because of change (p408) (Magis, 2010). The proliferation of the use of resilience goes hand in hand with increased emphasis on participation, capacity building and empowerment – understanding that local needs and capacities should drive the process of development, and that communities must be equal stakeholders and not merely recipients of assistance (Tadele and Manyena, 2009). While capacity building is not new in development, it is re-emerging in the unique context of GEC, mainly climate change (Lemos *et al.*, 2007).

The debate on resilience to GEC is largely driven by top-down policy efforts and has been to some degree ignorant of the existing body of knowledge on human responses to GEC<sup>6</sup> that may or may not involve climate change (Kelman, 2010). This is true for drylands, where adaptation to climate variability and drought – as distinct from climate change – has been a factor of life since human-kind occupied these regions. In the context of resource variability and uncertainty in its temporal and spatial distribution, dryland livelihood systems are inherently geared to reduce vulnerability, adapt to dynamic conditions, and capitalize on opportunities for innovation (Adger *et al.*, 2009a; Stringer *et al.*, 2009; Mearns and Norton, 2010). Strategies in drylands to adapt to variability are well-documented and, among many, include rainwater harvesting, livelihood diversification, risk sharing, and seasonal migration (Davies, 1996; Ellis, 1998; Eriksen *et al.*, 2005)<sup>7</sup>. Efforts to build resilience-based drylands development strategies can benefit from (successful and unsuccessful) ways communities have responded to environmental risks and uncertainty in the past, and enhance existing adaptive potentials rather than developing new ones (Dovers, 2009).

Resilience is about human capacity to strengthen or weaken system attributes to either prevent undesirable changes or facilitate desirable transformations (Cinner *et al.*, 2009). The

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<sup>6</sup> A notable exception is the recent volume of *Participatory Learning and Action* that focuses on community-based adaptation to climate change initiatives (Reid *et al.*, 2009).

<sup>7</sup> A note of caution has to be made about coping strategies<sup>7</sup>: these are usually forced responses to shocks that erode the asset base of a household, more generally diminish their ability to survive, and leave the household more vulnerable to future shocks (Ellis, 2000). Coping strategies are not part of resilience (Cannon and Müller-Mahn, in press).

most appropriate response to GEC can be placed on a continuum from maintaining a *status quo*, to adaptation, or transformation (Magis, 2010). Response capacities to GEC are tied to local conditions, including social, economic, biophysical, cultural, and institutional factors that determine the trajectory of human-environment interactions and include: access to capitals (i.e. resource, economic, and social), range of technological options, enabling policy environment, institutional capacity, capacity for collective action, cultural values, aspirations, perceived risk, good governance, and political will (Klein *et al.*, 2007; Rogner *et al.*, 2007). Tompkins and Adger (2005) identify the availability of new technologies and the ability and willingness of society to adopt them as critical factors that constrain or enable response capacity. Adaptive capacity is an underlying, context-specific condition of resilience (Janssen and Ostrom, 2006) and can be enhanced by investing in knowledge production from different sources, facilitating learning and flexibility of institutions to experiment and adopt new solutions, by increasing the level of resources (e.g. income, education) to the most vulnerable people, and building general response capacity to broader livelihood challenges (Lemos *et al.*, 2007; Marshall, 2010). Importantly, Adger *et al.* (2009a) identify the "...ability to adapt is determined in part by the availability of technology and the capacity for learning but fundamentally by the ethics of the treatment of vulnerable people and places within societal decision-making structures." (p350).

Resilience is important as communities are allowed to build capacity to govern livelihood adaptations or transformations in an environment characterized by change and uncertainty (Folke, 2009; Scoones, 2009; Magis, 2010). By refocusing development policy and practice towards maximizing adaptive and transformative capacities, resilience can contribute to creating new development pathways that are sensitive to GEC and to other kinds of unforeseen change (Boyd *et al.*, 2008). An improved use of existing adaptive knowledge and skills of dryland communities to respond to uncertainty is important (Mortimore, 2009). Framing resilience as the general capacity of a community to change may be an effective strategy to mainstream GEC responses into development (Stehr and von Storch, 2005; Klein *et al.*, 2007). Thus, resilience in drylands should be pursued to decrease vulnerability to multiple threats and increase general resilience in response to immediate needs and future risks and aspirations within a development framework (Gwimbi, 2009; Stringer *et al.*, 2009).

### *Systems Dynamics and Adaptive Management*

For the past century, approaches to managing ecological systems were built on assumptions of stability, linearity and predictability in behavior, while change was seen as incremental and knowable, if not always controllable. In this paradigm, management approaches focused on 'command-and-control' methods of optimizing yields of specific systems within the parameters that were then understood (Folke, 2009; Nelson and Stathers, 2009). Earlier development models were based on models of linear progress that were to be achieved by de-contextualized blueprint solutions of adding capital, knowledge and technology. Thus, the simple, generalized, equilibrium-based models of ecosystem management also appeal to conventional development models grounded on the assumption of a stable, predictable and manageable world (Leach *et al.*, 2008).

The emerging paradigm is based on an understanding of increasingly complex SES characterized by non-linearity, uncertainty, multi-scale dynamics and interdependences that are the norm rather than the exception, and resilience provides a conceptual tool to deal with uncertainty (Berkes, 2007; Folke, 2009). Social, economic, political, and technological processes add complexity, as these involve multiple actors at different scales with diverse perspectives and agendas (Leach *et al.*, 2008). Uncertainty and complexity also dominate the systems that development is concerned with, e.g. livelihood systems (Leach *et al.*, 2008). This

view raises questions about the effectiveness of conventional, often static and standardized, development models in addressing the complex and context-specific dynamics of change that is unpredictable, often sudden, and especially painful for the poor and vulnerable (Leach *et al.*, 2008; Nelson and Stathers, 2009). Attention is shifting from the control of change and maximizing productivity to managing human capacity to spread and manage risk.

Resilience thinking challenges common views of the management of SES and of development by emphasizing uncertainty and complexity in systems where gradual and sudden changes interact to create additional vulnerabilities but also open windows of opportunity for adaptation or innovation (Folke, 2009). Thus, options for transformations towards more sustainable livelihoods in changing environments become possible via resilience. Howe (2010) emphasizes that a view that accepts poverty and food insecurity as non-linear systems is needed to address these challenges in a more appropriate manner.

Systems dynamics are intimately linked across different temporal and spatial scales, and must be considered in building resilience (Adger *et al.*, 2005a). First, the lack of reliable predictions about future GEC makes it difficult to plan effective responses. Second, while certain adaptation strategies may reduce risk at a short time scale, they may be unsustainable in the long run and undermine long-term adaptive capacity. Third, successful adaptations for one community may result in negative externalities for another, in turn limiting their adaptive capacity (Adger *et al.*, 2005a; Adger *et al.*, 2009a; Boyd *et al.*, 2009). Accepting uncertainty and the need for flexibility in responding to GEC will require thinking on longer timescales. Within a development framework, this may be a challenge since existing mechanisms of planning, evaluation and funding may not be appropriate (Boyd *et al.*, 2009). However, long-term planning and investment is needed for strengthening resilience to GEC and other challenges. In the light of growing emphasis on participation, capacity building and empowerment in development, longer time frames become necessary to build lasting response capacities at different scales. The impacts of GEC and potential responses are also relevant at different scales. The practical application of resilience becomes meaningful at local or regional levels, where resilience, agency and collective capacity are linked to social organization, institutional context, knowledge and governance (Adger, 2000; Tompkins and Adger, 2004; Walker *et al.*, 2004; Gallopin, 2006). At this level, GEC, poverty, and vulnerability to other stressors interact and converge into one complex problem of development, which has to be addressed as such (Bizikova *et al.*, 2007; Reid *et al.*, 2009).

Linking resilience and development will require innovate governance approaches that can take the complexity of system dynamics and scales into consideration (Adger *et al.*, 2009a). Resilience in the light of food insecurity and poverty requires integrated frameworks that place livelihoods at the center of analysis, consider the structural context in which they operate and acknowledge the limits of predictability and embrace uncertainty, inevitability of change and imperfect knowledge (Stringer *et al.*, 2009). Berkes (2007) emphasizes the need to develop new approaches to deal with unpredictable change and, at the same time, enhance knowledge about systems dynamics to reduce the degree of uncertainty.

Adaptive management or governance concepts are central to emerging approaches<sup>8</sup> that aim to improve decision-making in the light of uncertainty and governance of SES where cross-scale interactions are high (Armitage *et al.*, 2009; Cannon and Müller-Mahn, in press). Adaptive management is an evolutionary process that emphasizes the capacity for learning through complexity and change, self-organization, collaboration, trust building and conflict resolution to facilitate flexibility and innovation in response to change (Armitage *et al.*, 2009; Cannon and Müller-Mahn, in press). It promotes resilience by supporting innovative institutional arrangements at different scales, by creating linkages between different knowledge with policy, and by linking resilience with development processes. Adaptive management acknowledges limitations of single knowledge systems and combines different sources of knowledge, including local and scientific, past and present, while fostering partnerships to creatively address development and GEC challenges under uncertainty (Berkes, 2007; Kelman, 2010). The approaches recognize the limitations of one way top-down or community-based approaches to address present context-specific conditions and future uncertainties and calls for their integration to facilitate cross-scale learning and collaboration, multi-level partnerships and institutions, and coordinated decision-making for resilience (Cannon and Müller-Mahn, in press). Resilience is concerned with the ability to respond to change, not to control it; and is thus central to adaptive management.

#### *Different Intellectual Foundations*

Resilience and development narratives emerged from different intellectual disciplines. While the former has its roots in the natural sciences, the latter is in the social sciences. This underlines the importance of clarity in the definitions of resilience (or vulnerability and adaptation) when employed in the GEC debates and development. Differences between resilience and development with respect to timeframes, objectives and assumptions also need to be considered (Cannon and Müller-Mahn, in press). Both perspectives can make significant contributions to an integrated perspective of resilience in development, while at the same time challenging the underlying paradigms.

Resilience, as a natural science concept embedded in systems thinking, cannot be uncritically transferred to social systems (Adger, 2000). The concept must be used carefully, considering that human systems are shaped by power relations, political agendas and decision-making that is not necessarily rational. However, resilience can bridge social and ecological issues, e.g. within livelihood systems that depend on natural resources (Adger, 2000). Cannon and Müller-Mahn (in press) are concerned that the natural science perspective of resilience may distract from the fact that GEC and other hazards are also social constructions, and may ignore the importance of power and depoliticize the causes of vulnerability. They assert that the concept of vulnerability may be more useful in development with its focus on differential vulnerability (Cannon and Müller-Mahn, in press). Though, resilience must be conceptualized not only based on its intellectual foundations in SES, but considering its roots in vulnerability theories – thus adding a strong focus on human agency and adaptive capacities, persisting inequalities and structural vulnerabilities.

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<sup>8</sup> Multi-level governance is another example that emphasizes interactions between individual or collective actors, their actions, perceptions, priorities and power relationships, in responding to change (Dietz *et al.*, 2003; Ostrom and Janssen, 2005; Adger *et al.*, 2009b).



The foundations of development are in the social sciences, rooted in the rationalist approaches to economic growth as the means to enhance general human well-being (Grist, 2008; Cannon and Müller-Mahn, in press). While there are rhetorical shifts in development thinking and examples of significant change in development practice, models that emphasize economic growth, linear progress, and blueprint solutions still persist, leaving little room for paradigm shifts that can incorporate uncertainty of GEC, resilience thinking and the need for context-specific, adaptive approaches (Grist, 2008; Boyd *et al.*, 2009). A clear distinction has to be made between economic growth and development to enhance well-being.

The challenges and uncertainties that are brought to the development arena by GEC may provide a stimulus for reframing development policy and practice towards more resilient development pathways by explicitly considering change (Leach *et al.*, 2008). Lessons can be learnt from past experiences, while also promoting positive synergies between development policies and responses to GEC, addressing structural inequalities within existing power structures, and promoting sustainable livelihoods and pro-poor growth (Lemos *et al.*, 2007; Leach *et al.*, 2008). Communities have to be empowered to become the primary decision makers about their own resilience in the light of myriad challenges and uncertainties.

### **Resilience as ‘General Resilience’**

This discussion shows that assumptions of what constitutes resilience and disciplines that have informed it are necessary to consider when applying resilience thinking in development. Using the concept primarily as maintaining a *status quo* does not make resilience useful in development. In food insecure livelihood systems, resilience is ultimately about improving or transforming existing systems into more sustainable ones, about decreasing vulnerabilities, withstanding undesired change, and using opportunities that arise.

Although resilience is defined in relation to a hazard, it must be kept in mind that poor people face a myriad of challenges in their daily struggle for survival, with GEC being only one and hardly the most proximate. Moreover, GEC cannot be effectively predicted: decisions must be made in the context of inevitable uncertainty. People have their own sets of priorities and adding resilience to GEC as a separate factor will possibly result in it being at the bottom of the list. “Their strategies represent the aggregate result of multiple drivers, needs and aspirations operating over myriad time and spatial scales.” (p762) (Stringer *et al.*, 2009) Poor households may have little capacity to invest in reducing their vulnerability to unknown GEC, which is just another challenge (Pelling, 2003). GEC should not be seen in isolation of livelihood concerns nor place additional strain on household assets. Addressing GEC is likely to be more successful if responses are integrated into a package of development strategies (Parry, 2009). In this context, it is critical to see resilience as the general capacity of people to make their own decisions about what constitutes resilience and how to strengthen, weaken or transform it to move out of poverty in the light of various future changes (Walker *et al.*, 2010). Walker *et al.* (2010) call this ‘general resilience’, while Boyd *et al.* (2008) refer to ‘latent capacity’. Resilience needs to be firmly rooted in development that specifically aims to increase capacity for decision-making about how to respond to change.

The most vital aspect of resilience for development is its focus on building capacity, to strengthen problem-solving and decision-making capacities, and facilitate innovation, adaptation and transformation in the light of current livelihood challenges and uncertainty about future changes. This approach to resilience responds to the specific situation of poor communities that have to deal not only with poverty, food insecurity and environmental degradation, but also with inequality, marginalization, and uncertain futures in all of these dimensions. Thus, linking resilience and development calls for ‘win-win’ solutions (Grist,

2008) that help improve the capacities to meet immediate needs, address structural problems of poverty, and simultaneously build long-term social capacity in the light of the unknown.

Resilience thinking can contribute to more holistic development approaches. Households and communities with better access to food, water, health care, education and infrastructure will be more resilient to GEC and better prepared to deal with the challenges (or opportunities) these changes may hold (Dodman *et al.*, 2009; Mearns and Norton, 2010). In terms of program design or implementation there are no easy nor obvious ways to strengthen resilience. But it cannot be seen as a short-term and palliative cure in development. It is rather a long-term commitment that is adaptive and flexible (Boyd *et al.*, 2008). With this in mind, community resilience is well placed, as it provides the middle ground between meeting short-term immediate needs and developing for a 'sustainable future' (Callaghan and Colton, 2008). 'General resilience' is well suited for development and has the potential to take an influential position in theory and practice. Its strength lies in its applicability to a variety of contexts, as it stands for capacity building in the light of current and future livelihood challenges, for flexibility in its response to change and adaptive management in the light of uncertainty.

## Conclusion

Progress in human development is threatened by the complexities of GEC – one of the defining challenges of our time. Challenges of GEC include the magnitude of environmental disturbances and the vulnerability of SES, as well as designing appropriate societal responses. GEC is creating new conditions for poverty reduction. Development theory and practice have undergone major paradigm shifts and more recently had to integrate the growing challenges of GEC. It is well-timed to take a closer look at the linkages between resilience and development. The prominence of resilience thinking can promote a development policy and practice that is better suited to address the challenges and opportunities that GEC creates for poor communities. Adjustments have to be made within resilience thinking and development theory and practice in order to facilitate the integration of both.

Resilience and adaptation have become buzzwords in the GEC arena and there is a threat of them becoming meaningless. With enhanced international attention on and funding for developing societal responses to GEC, it is time to tailor integrated resilience-based approaches. For resilience thinking to be relevant in development, it must be clearly defined in a context-specific and participatory manner. It is important to appreciate that resilience is not about maintaining a *status quo*, but about addressing how societies can develop in an increasingly changing world. 'General' resilience that focuses on capacity building and facilitates transformation towards more desirable livelihoods is most suited. It has to address structural vulnerabilities that affect livelihoods and take power constellations into consideration. Building resilience will require a fundamental reconsideration of poverty reduction strategies and a commitment to tackle social disparities and inequalities.

GEC alters the context of development and whether the prevailing instruments of development policy and practice can successfully deal with this, remains to be seen. The integration of resilience sheds new light on how to make progress in poverty reduction. It is likely that shifts in development thinking may have implications for existing political and organizational structures in development. It is also likely to call into question current ways of thinking and require new approaches, policies, and tools. Resilience thinking does not provide quick solutions, but rather contributes a long-term, multi-dimensional perspective of building capacities for an improved response to current needs and future change. This calls for adjusted timeframes of implementing and funding development programs. A holistic view in the light of uncertainty, adaptive management approaches may help build institutions and governance systems that facilitate resilience in complex and dynamic systems. In the long term, the focus

of development must build capacities at different scales to better meet immediate and future needs for poverty reduction. Resilience is not a solution in itself but can contribute towards developing holistic development.

Development is about “people developing the capabilities that empower them to make choices and to lead lives that they value” (p1) (UNDP, 2007). GEC effectively limits human choices. Sustainable development pathways have to consider resilience and adaptive capacities as integral parts of livelihood systems and support them where possible. A broader framework of development that emphasizes empowerment, capacity building and governance is required to address the arising challenges of GEC. A livelihoods approach builds on these principles and can be a valuable tool in the formulation of appropriate policies and programs. Facilitating better access to opportunities for the poor through livelihoods approaches may turn out to be more cost effective for poverty reduction, as well as for building resilience, than attempting both agendas separately. Empowerment will not only put poor communities at the center of development, but at the same time strengthen their resilience.

The potential to effectively tackle the challenges GEC poses in drylands is constrained by multiple challenges that include deep-rooted poverty, chronic food insecurity, uneven economic growth and conflict. Mortimore (2009) promotes a new drylands development paradigm to realize development potential, while recognizing the need for an enhanced understanding of the roles of resilience, uncertainty and risk; and calling for stronger emphasis on human capacity in the light of GEC pressures.

In conclusion, while resilience has made its way onto the development agenda, it remains largely rhetorical and theoretical. Unprecedented GEC adds urgency to the need for development pathways that incorporate the complexity of existing and emerging challenges. There is a need to better integrate resilience within a new paradigm that addresses local needs by taking an integrated perspective. This is particularly important in drylands, where the role of uncertainty needs to be better understood to realize a potential for development, while relying on human agency and internal capacity for adaptation and innovation in the light of GEC. A resilience-based approach to drylands development facilitates the complex interactions of societal responses to GEC within the wider context, recognizing that structural factors that determine community resilience are inherently the ones that shape development. It offers an adaptive and interdisciplinary view of GEC, while strengthening community participation within the process towards sustainable pathways out of poverty.

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